

MORBIDITY AND MORTALITY WEEKLY REPORT

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MORBIDITY AND MORTALITY WEEKLY REPORT

Epidemiologic Notes and Reports

Endotoxic Reactions Associated with the Reuse of Cardiac Catheters – Massachusetts

During a 2-week period in July 1978, 3 cases of suspected endotoxic reactions (fever, chills, and hypotension) occurred in patients undergoing cardiac catheterization at a Massachusetts hospital. An investigation revealed that reusable intravascular catheters, although sterile, were contaminated with 0.3 to 7.4 nanograms of endotoxin and that this contamination was related to procedures employed to clean and disinfect the catheters.

At the time the endotoxic reactions occurred, used catheters were rinsed with hospital distilled water, wiped to remove clotted blood, and then soaked in Detergicide,* a quaternary ammonium compound. Next, the bore of the catheter was flushed continuously for 2 hours with distilled water, followed by a second flush with 1 liter of commercial pyrogen-free, sterile, distilled water. Finally, the catheters were wrapped and gas-sterilized. The administration set for the delivery of the pyrogen-free fluid had not been changed regularly.

The hospital-supplied distilled water contained greater than 0.2 ng of endotoxin per ml even when samples were taken directly from the storage tanks. Cultures of samples taken from the cardiac catheterization laboratory's distilled water tap and from the research laboratories contained up to 310 colonies of *Pseudomonas cepacia* per ml, while storage tank samples were sterile.

Five previously used, but subsequently cleaned and sterilized, catheters contained levels of endotoxin ranging from 0.3 ng to 7.4 ng per catheter, as measured by the Limulus Amebocyte Lysate assay. (A level of 0.05 ng is considered pyrogenic by the laboratory performing the assay.) All catheters were sterile when cultured. New, sterile catheters were free of endotoxin. After only 1 use and cleaning, catheter flushes yielded excessive endotoxin. An aliquot of distilled water, used for the first continuous flush, contained greater than 0.2 ng of endotoxin per ml and, on culture, yielded heavy growth of *P. cepacia*. A 4-ml rinse from the administration set used for the second flushing contained 0.06 ng of endotoxin per ml but was sterile on culture. No samples from patients were available.

*Use of trade name is for identification only and does not constitute endorsement by the Public Health Service, U.S. Department of Health, Education and Welfare.

Endotoxic Reactions — Continued

Two previously used catheters (1 had just been used) were cleaned in the usual manner through the Detergicide soaking. Flushing the bore of these catheters with pyrogen-free, distilled water reduced levels of endotoxin from as high as 0.275 ng/ml at the beginning of the wash to less than 0.02 ng/ml at the end of the wash, and reduced bacterial contamination from 30 bacterial colonies/ml to zero. Each catheter was then enclosed in a sterile cylindrical container and shaken with 10 ml of pyrogen-free, distilled water to assess contamination of the outer surface of the catheter. This procedure yielded 0.4 ng and 0.75 ng endotoxin, respectively, from the 2 catheters and greater than 10^3 bacterial colonies/ml of wash from the freshly used catheter. It was, therefore, concluded that most of the contamination came from the external catheter surface.

A similar problem occurred in the catheterization laboratory in 1973. The distilled water supply used for washing the reusable catheters was contaminated with *Pseudomonas* species and contained high levels of endotoxin. At that time, institution of a final rinse using sterile, pyrogen-free, distilled water followed by ethylene oxide sterilization was associated with cessation of the outbreak. Since then, occasional reactions had been observed, but frequently the patients had received contrast material prior to the reactions, making an etiologic diagnosis difficult.

This investigation resulted in the recommendation that disposable catheters be used. When this was not possible, it was recommended that pyrogen-free, sterile, distilled water be used in the cleaning procedure, and that both the outer and inner surfaces of the catheter be flushed. Detergicide was freshly prepared daily, using pyrogen-free, sterile, distilled water. After the catheters were cleaned and packaged, they were stored at 4 C until sterilized. In the 5-month period since this outbreak, there have been no further suspected endotoxic reactions.

Reported by E Bauer, RN, P Densen, MD, D Faxon, MD, C Kloster, RN, C Melidossian, RN, University Hospital, Boston; R Kundsinn, ScD, P Ryan, BA, Peter Bent Brigham Hospital, Boston; N Fiumara, MD, State Epidemiologist, Massachusetts Dept of Public Health; Hospital Infections Br, Bacterial Diseases Div, Bur of Epidemiology, CDC.

Editorial Note: The precise mechanism by which catheters used for cardiac catheterization were contaminated with endotoxin was not proven, but this investigation suggests that contamination was introduced during the cleaning procedure. Hospital supplies of distilled water, used in cleaning, were contaminated. Furthermore, the detergent-disinfectant preparation that was used in the preliminary cleaning, an aqueous quaternary ammonium formulation, has been shown to be ineffective against *P. cepacia* and may even permit the selective growth of this and other microorganisms (1). Presumably, viable microorganisms were introduced during cleaning from the distilled water, the Detergicide failed to kill the contaminants or permitted their growth, and the final sterilization killed the contaminants but allowed high levels of residual endotoxin to persist. Although a variety of detergent-disinfectants may be used safely for environmental sanitation of floors, surfaces, and the like, these agents must be used with utmost caution with critical medical devices that come in contact with any normally sterile body tissue. An effective sterilizing procedure, such as ethylene oxide, will kill microorganisms but will not remove endotoxin.

This report further highlights the hazards that may result from reuse of some medical devices. Ethylene oxide sterilization and reuse of disposable arterial pressure domes, meant to be used once and discarded, have previously been documented to produce defects in the dome membranes that were followed by epidemic bacteremia (2). Some

Endotoxic Reactions – Continued

but not all, medical devices can be cleaned and safely sterilized. If practical and economical, disposable devices are preferable to reusable devices that are difficult to sterilize.

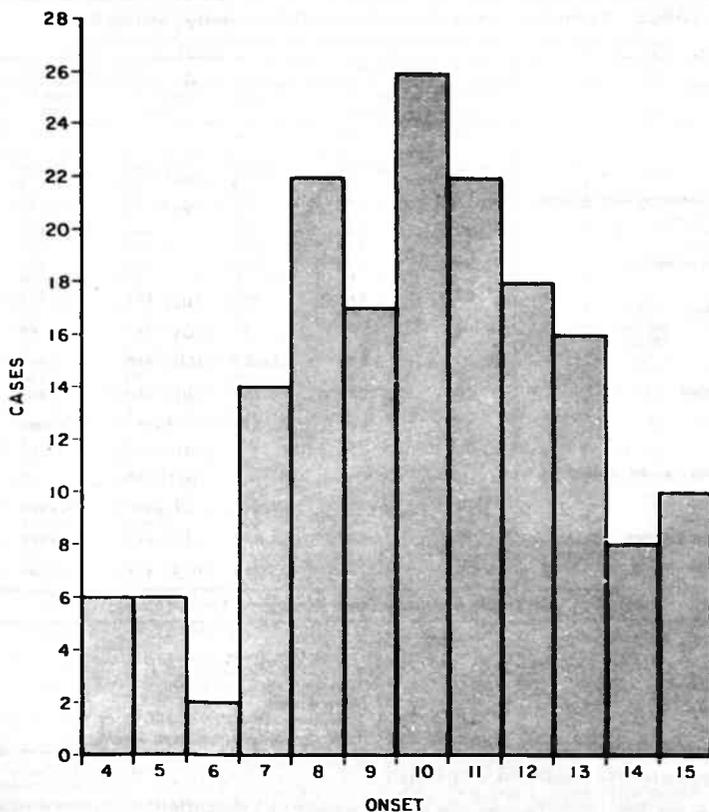
References

1. Dixon RE, Kaslow RA, Mackel DC, Fulkerson CC, Mallison GF: Aqueous quaternary ammonium antiseptics and disinfectants. Use and misuse. JAMA 236:2415-2417, 1976
2. MMWR 26:266, 1977

Influenza – California

On December 11, 1978, a California school district reported that absenteeism had increased from less than 10% to approximately 23%, apparently due to an influenza-like illness. Two schools, an elementary school and a nearby senior high school, were selected for viral and epidemiologic studies (Figure 1).

FIGURE 1. Influenza in elementary and high school students, California, by date of onset, December 4-15, 1978



Influenza (California) — Continued

Eight of 14 throat swabs obtained from the elementary school students and 7 of 13 from the high school students yielded influenza A/Brazil/78-like virus, a variant of the A/USSR/77 (H1N1) prototype (7). A telephone survey was conducted among approximately 250 households selected at random from each school. Illness was considered influenza if it occurred from December 4-15, and if it included fever and at least 2 of the following: headache, myalgia, cough, and sore throat.

Seventy-four of 184 (40.2%) of the elementary and 99 of 185 (53.5%) of the high school students fit this case definition. The peak date of onset occurred in the high school on December 10, and in the grade school on December 13 (Figure 1). The median duration (4 days) and median days absent (3) were the same for both sites. The frequency of nausea and vomiting in the elementary school (41.7% and 28.4%, respectively) was higher than in the high school (31.3% and 17.2%, respectively). The incidence of diarrhea was approximately the same in both groups (17.6% of the elementary and 18.1% of the high school students). More of the elementary students were seen by a physician than the high school students (29.7% vs. 18.1%); no deaths attributable to influenza were reported from either school.

Reported by Glendale Unified School District; S Fannin, MD, Los Angeles County Dept of Health; J Chin, MD, State Epidemiologist, California Dept of Health Services; Immunization Div, Bur of State Services, CDC.

Reference

1. MMWR 27:521-522, 1978

TABLE I. Summary — cases of specified notifiable diseases, United States
[Cumulative totals include revised and delayed reports through previous weeks.]

DISEASE	3rd WEEK ENDING		MEDIAN 1974-1978**	CUMULATIVE, FIRST 3 WEEKS		
	January 20, 1978	January 21, 1978*		January 20, 1978	January 21, 1978*	MEDIAN 1974-1978**
Aseptic meningitis	51	44	36	172	117	117
Brucellosis	—	—	3	4	3	5
Chickenpox	4,839	3,337	3,899	11,948	9,149	9,166
Diphtheria	1	3	3	11	3	3
Encephalitis: Primary (arthropod-borne & unsp.)	5	10	10	21	23	39
Post-infectious	3	1	1	5	7	7
Hepatitis, Viral: Type B	230	281	281	666	805	805
Type A	514	507	735	1,371	1,326	1,831
Type unspecified	249	169	160	564	449	449
Malaria	8	11	6	19	26	12
Measles (rubeola)	171	211	446	351	595	1,068
Meningococcal infections: Total	35	48	31	117	89	88
Civilian	35	48	31	117	89	86
Military	—	—	—	—	—	—
Mumps	255	384	1,062	618	948	3,043
Pertussis	25	49	29	90	144	76
Rubella (German measles)	81	234	209	210	405	499
Tetanus	—	—	1	1	1	3
Tuberculosis	507	407	502	1,257	1,069	1,215
Tularemia	6	—	1	9	5	6
Typhoid fever	3	4	5	9	13	16
Typhus fever, tick-borne (Rky. Mt. spotted)	5	—	—	10	2	2
Venereal diseases:						
Gonorrhea: Civilian	17,709	16,959	18,832	51,886	51,944	56,678
Military	374	344	403	1,452	1,095	1,531
Syphilis, primary & secondary: Civilian	451	400	489	1,273	1,048	1,306
Military	5	5	8	11	15	17
Rabies in animals	48	50	46	112	139	120

TABLE II. Notifiable diseases of low frequency, United States

	CUM. 1978		CUM. 1979
Anthrax	—	Poliomyelitis: Total	1
Botulism	—	Paralytic † (Mich. 1)	—
Congenital rubella syndrome	1	Psittacosis † (Ups. NY 1, Calif. 1)	3
Leprosy (Calif. 1)	13	Rabies in man	—
Leptospirosis (Ga. 1)	2	Trichinosis † (Mass. 2)	2
Plague	—	Typhus fever, flea-borne (endemic, murine)	—

* Delayed reports received for calendar year 1978 are used to update last year's weekly and cumulative totals.

** Medians for gonorrhea and syphilis are based on data for 1976-1978.

† The following delayed report will be reflected in next week's cumulative total: Polio, para. 1

‡ Delayed report: Polio, para. 1 (1978); Psittacosis: Okla. 1 (1978); Trichinosis: N.J. 1 (1978)

TABLE III. Cases of specified notifiable diseases, United States, weeks ending January 20, 1979, and January 21, 1978 (3rd week)

REPORTING AREA	ASEPTIC MENINGITIS		BRUCELLOSIS	CHICKENPOX	DIPHTHERIA		ENCEPHALITIS			HEPATITIS (VIRAL), BY TYPE			MALARIA	
	1978	1979			1978	1978	CUM. 1979	Primary	Post-infectious	B	A	Unspecified	1978	CUM. 1979
	1978	1979	1978	1978	CUM. 1979	1978	1978*	1979	1978	1978	1979	1978	CUM. 1979	
UNITED STATES	51	-	4,839	1	11	5	10	3	230	514	249	8	19	
NEW ENGLAND	2	-	815	-	-	-	-	-	10	22	11	-	2	
Maine	-	-	147	-	-	-	-	-	-	5	-	-	-	
N.H. †	-	-	6	-	-	-	-	-	-	4	1	-	-	
Vt.	-	-	-	-	-	-	-	-	-	-	-	-	-	
Mass.	2	-	332	-	-	-	-	-	1	5	9	-	-	
R.I.	-	-	173	-	-	-	-	-	3	1	-	-	2	
Conn.	-	-	157	-	-	-	-	-	6	7	1	-	-	
MID. ATLANTIC	2	-	209	-	-	1	-	-	31	27	28	2	2	
Upstate N.Y.	2	-	163	-	-	1	-	-	3	4	1	-	-	
N.Y. City	-	-	46	-	-	-	-	-	8	12	19	2	2	
N.J. †	-	-	NN	-	-	-	-	-	20	11	8	-	-	
Pa. †	NA	NA	NA	NA	-	NA	-	-	NA	NA	NA	NA	-	
E.N. CENTRAL	4	-	1,838	-	-	-	3	2	37	61	14	-	1	
Ohio	-	-	115	-	-	-	1	1	7	8	-	-	1	
Ind.	-	-	-	-	-	-	-	-	3	1	4	-	-	
Ill.	-	-	152	-	-	-	1	-	7	23	4	-	-	
Mich.	4	-	999	-	-	-	1	1	19	28	6	-	-	
Wis.	-	-	572	-	-	-	-	-	1	1	-	-	-	
W.N. CENTRAL	7	-	720	-	-	2	1	-	12	47	9	1	1	
Minn.	-	-	3	-	-	-	-	-	2	19	2	1	1	
Iowa	4	-	342	-	-	1	1	-	1	3	-	-	-	
Mo.	1	-	168	-	-	-	-	-	4	6	7	-	-	
N. Dak. †	1	-	14	-	-	-	-	-	-	2	-	-	-	
S. Dak. †	-	-	11	-	-	-	-	-	1	6	-	-	-	
Nebr.	1	-	24	-	-	1	-	-	4	10	-	-	-	
Kans.	-	-	158	-	-	-	-	-	-	1	-	-	-	
S. ATLANTIC	6	-	587	-	-	-	1	-	32	52	16	1	2	
Dist.	-	-	3	-	-	-	-	-	-	4	-	-	-	
Md.	-	-	111	-	-	-	-	-	4	1	1	-	-	
D.C.	-	-	2	-	-	-	-	-	2	-	-	-	-	
Va.	1	-	37	-	-	-	-	-	5	4	3	1	2	
W. Va. †	1	-	339	-	-	-	-	-	1	8	1	-	-	
N.C.	3	-	NN	-	-	-	1	-	3	2	2	-	-	
S.C.	-	-	5	-	-	-	-	-	2	7	2	-	-	
Ga. †	-	-	-	-	-	-	-	-	10	11	-	-	-	
Fla.	1	-	90	-	-	-	-	-	5	15	7	-	-	
E.S. CENTRAL	18	-	101	-	-	-	1	-	30	31	2	-	-	
Ky.	6	-	73	-	-	-	-	-	9	8	-	-	-	
Tenn.	2	-	NN	-	-	-	1	-	13	18	-	-	-	
Ala.	10	-	25	-	-	-	-	-	8	3	2	-	-	
Miss.	-	-	3	-	-	-	-	-	-	2	-	-	-	
W.S. CENTRAL	2	-	110	-	-	-	1	-	11	96	51	3	4	
Ark. †	-	-	6	-	-	-	-	-	1	-	2	1	2	
La.	-	-	NN	-	-	-	-	-	-	5	-	-	-	
Okla.	1	-	-	-	-	-	-	-	-	-	1	-	-	
Tex.	1	-	104	-	-	-	1	-	10	91	48	2	2	
MOUNTAIN	1	-	95	1	1	2	-	-	9	77	59	-	-	
Mont.	-	-	26	-	-	1	-	-	1	6	-	-	-	
Idaho	-	-	2	-	-	-	-	-	-	1	1	-	-	
Wyo.	-	-	-	-	-	1	-	-	-	-	-	-	-	
Colo.	-	-	49	-	-	-	-	-	2	7	6	-	-	
N. Mex.	-	-	-	-	-	-	-	-	3	22	-	-	-	
Ariz.	-	-	NN	1	1	-	-	-	2	26	42	-	-	
Utah	-	-	5	-	-	-	-	-	1	7	7	-	-	
Nev.	1	-	13	-	-	-	-	-	-	8	3	-	-	
PACIFIC	9	-	364	-	10	-	3	1	58	101	59	1	7	
Wash.	-	-	336	-	10	-	-	-	4	17	4	-	-	
Oreg.	-	-	7	-	-	-	-	-	11	15	5	-	-	
Calif. †	2	-	-	-	-	-	-	-	42	68	50	1	7	
Alaska	-	-	13	-	-	-	1	-	-	1	-	-	-	
Hawaii	7	-	8	-	-	-	-	-	1	-	-	-	-	
Guam	-	-	-	-	-	-	-	-	-	-	-	-	-	
P.R.	NA	NA	NA	NA	-	NA	-	-	NA	NA	NA	NA	-	
V.I.	-	-	1	-	-	-	-	-	1	-	1	-	-	
Pac. Trust Terr. †	-	-	1	-	-	-	-	-	-	-	-	-	-	
	-	-	6	-	-	-	-	-	-	-	4	-	-	

NN: Not notifiable.

NA: Not available.

* Delayed reports received for 1978 are not shown below but are used to update last year's weekly and cumulative totals.

† The following delayed reports will be reflected in next week's cumulative totals: Asep. meng.: N.J. +1; Chickenpox: N.H. +4, Pa. +82, W. Va. +1, Calif. +40, Pac. Tr. Terr. +12; Hep. B: W. Va. +1, Ga. +7, Ark. +4; Hep. A: S. Dak. +9, W. Va. -1, Ga. +21, Ark. +2; Hep. Unsp.: Ark. +2, Pac. Tr. Terr. +1.

TABLE III (Cont.'d). Cases of specified notifiable diseases, United States, weeks ending January 20, 1979, and January 21, 1978 (3rd week)

REPORTING AREA	MEASLES (RUBEOLA)			MENINGOCOCCAL INFECTIONS TOTAL			MUMPS		PERTUSSIS	RUBELLA		TETANUS
	1979	CUM. 1979	CUM. 1978*	1979	CUM. 1979	CUM. 1978*	1979	CUM. 1979	1979	1979	CUM. 1979	CUM. 1979
UNITED STATES	171	351	595	35	117	89	255	618	25	81	210	1
NEW ENGLAND	1	3	14	1	2	6	8	29	1	10	33	-
Maine †	-	-	10	-	-	1	2	10	1	-	1	-
N.H.	1	1	2	-	-	-	1	3	-	1	2	-
Vt.	-	2	2	-	-	-	-	-	-	6	21	-
Mass.	-	-	-	1	2	4	-	1	-	3	9	-
R.I.	-	-	-	-	-	-	1	5	-	-	-	-
Conn.	-	-	-	-	-	1	4	10	-	-	-	-
MID. ATLANTIC	3	19	79	4	21	15	12	33	3	3	21	1
Upstate N.Y.	1	11	48	-	9	8	4	12	1	2	8	1
N.Y. City	2	8	20	1	8	5	2	6	2	1	3	-
N.J.	-	-	1	3	3	-	6	12	-	-	7	-
Pa.†	NA	-	10	-	1	2	NA	3	NA	NA	3	-
E.N. CENTRAL	30	92	295	6	15	10	98	239	8	23	51	-
Ohio	-	-	2	2	6	1	16	29	-	-	1	-
Ind.	-	5	14	1	2	3	-	15	-	-	7	-
Ill.	1	35	19	-	-	1	12	49	-	1	15	-
Mich.	25	43	248	3	7	4	17	30	3	15	21	-
Wis.†	4	5	12	-	-	1	53	116	5	7	7	-
W.N. CENTRAL	72	79	5	1	2	7	15	29	1	1	14	-
Minn.	-	-	-	-	-	2	-	-	-	-	-	-
Iowa	-	-	2	1	1	1	7	16	-	-	-	-
Mo.	72	78	1	-	1	3	1	2	1	-	2	-
N. Dak.	-	1	-	-	-	-	-	-	-	1	5	-
S. Dak.	-	-	-	-	-	-	-	-	-	-	-	-
Nebr.	-	-	-	-	-	-	-	-	-	-	-	-
Kans.	-	-	2	-	-	1	7	11	-	-	7	-
S. ATLANTIC	6	13	63	5	31	22	5	19	4	4	11	-
Del.	-	-	1	-	1	-	1	3	-	-	-	-
Md.	1	1	-	1	2	-	-	-	-	-	-	-
D.C.	-	-	-	-	-	-	-	-	-	-	-	-
Va.	1	1	31	1	4	3	2	6	-	-	-	-
W. Va.†	2	8	16	-	1	1	2	6	-	3	6	-
N.C.	-	-	8	-	5	5	-	3	1	-	-	-
S.C.	-	-	3	2	8	4	-	4	-	-	-	-
Ga.	-	-	-	1	8	4	-	-	3	-	-	-
Fla.	2	3	4	-	2	5	-	1	-	1	5	-
E.S. CENTRAL	5	5	67	5	8	1	68	128	2	-	3	-
Ky.	2	2	21	2	2	-	55	104	1	-	-	-
Tenn.	2	2	39	3	5	-	4	11	-	-	2	-
Ala.	-	-	-	-	1	1	1	2	1	-	1	-
Miss.	1	1	7	-	-	-	8	11	-	-	-	-
W.S. CENTRAL	11	40	22	9	15	12	25	75	2	3	9	-
Ark.	-	-	-	-	1	2	12	24	-	-	-	-
La.	-	-	3	-	1	-	-	7	-	-	-	-
Okla.	-	-	1	2	2	1	-	-	-	-	-	-
Tex.	11	40	18	7	11	9	13	44	2	3	9	-
MOUNTAIN	15	20	23	2	8	-	10	15	2	-	3	-
Mont.	3	6	22	-	1	-	1	2	1	-	3	-
Idaho	-	-	-	1	1	-	-	-	-	-	-	-
Wyo.	-	-	-	-	-	-	-	-	-	-	-	-
Colo.	-	-	1	-	-	-	4	7	1	-	-	-
N. Mex.	-	-	-	1	2	-	-	-	-	-	-	-
Ariz.	-	-	-	3	-	-	-	2	-	-	-	-
Utah	12	12	-	-	1	-	2	2	-	-	-	-
Nev.	-	2	-	-	-	-	1	2	-	-	-	-
PACIFIC	28	80	27	2	15	16	14	51	2	37	65	-
Wash.	8	44	7	-	1	3	2	15	-	11	15	-
Oreg.	-	1	1	-	-	-	2	5	1	-	-	-
Calif.	20	35	19	2	13	13	9	29	1	26	50	-
Alaska	-	-	-	-	-	-	-	-	-	-	-	-
Hawaii	-	-	-	-	1	-	1	2	-	-	-	-
Guam	NA	-	1	-	-	-	NA	-	NA	NA	-	-
P.R.	-	-	7	-	-	-	14	15	-	1	1	-
V.I.	1	1	-	-	-	-	-	-	-	-	-	-
Pac. Trust Terr. †	-	1	53	-	-	-	-	2	-	-	-	-

NA: Not available.

*Delayed reports received for 1978 are not shown below but are used to update last year's weekly and cumulative totals.

†The following delayed reports will be reflected in next week's cumulative totals: Measles: Pa. +3, Wis. -1, W. Va. -1, Pac. Tr. Terr. +1, Men.: Pa. +1; Mumps: Pa. +4; Pertussis: Pa. +1; Rubella: Maine +1, Pa. +2, W. Va. +1.

TABLE III (Cont'd). Cases of specified notifiable diseases, United States, weeks ending January 20, 1979, and January 21, 1978 (3rd week)

REPORTING AREA	TUBERCULOSIS		TULA-REMICIA	TYPHOID FEVER		TYPHUS FEVER (Tick-borne) (RMSF)		VENEREAL DISEASES (Civilian)						RABIES (In Animals)	
								GONORRHEA			SYPHILIS (Pri. & Sec.)				
	1978	CUM. 1978	CUM. 1978	1978	CUM. 1978	1978	CUM. 1978	1978	CUM. 1978*	CUM. 1978*	1978	CUM. 1978	CUM. 1978*	1978	CUM. 1978
UNITED STATES	507	1,257	9	3	9	5	10	17,709	51,886	51,944	451	1,273	1,048	112	
NEW ENGLAND	15	34	-	1	2	-	-	520	1,412	1,396	11	30	26	-	
Maine	1	2	-	-	-	-	-	34	114	87	-	-	-	-	
N.H. †	-	1	-	-	-	-	-	17	53	71	-	-	-	-	
Vt.	-	2	-	-	-	-	-	7	18	29	-	-	-	-	
Mass.	6	15	-	1	1	-	-	250	622	622	6	21	18	-	
R.I.	4	7	-	-	1	-	-	44	119	80	-	-	1	-	
Conn.	4	7	-	-	-	-	-	168	486	507	5	9	7	-	
MID. ATLANTIC	78	193	-	1	1	-	-	1,148	4,537	5,635	76	168	130	1	
Upstate N.Y.	22	38	-	-	-	-	-	185	1,229	300	-	6	-	1	
N.Y. City	45	92	-	1	1	-	-	739	2,007	2,339	62	138	90	-	
N.J.	11	28	-	-	-	-	-	224	825	1,393	14	21	24	-	
Pa. †	NA	NA	-	NA	-	NA	-	NA	476	1,603	NA	3	16	-	
E.N. CENTRAL	81	147	-	-	-	-	2	2,865	7,307	5,784	35	167	116	3	
Ohio	26	26	-	-	-	-	2	782	1,873	1,561	15	52	11	-	
Ind.	15	31	-	-	-	-	-	200	342	808	2	5	5	-	
Ill.	8	58	-	-	-	-	-	773	2,216	1,068	6	83	92	2	
Mich.	24	24	-	-	-	-	-	786	1,998	1,845	7	18	6	-	
Wis.	8	8	-	-	-	-	-	324	878	502	5	9	2	1	
W.N. CENTRAL	8	38	4	-	-	-	-	671	2,401	2,769	5	13	22	31	
Minn.	1	4	-	-	-	-	-	73	412	542	-	3	7	6	
Iowa	-	6	-	-	-	-	-	-	130	341	405	2	2	13	
Mo.	4	15	4	-	-	-	-	263	810	1,075	2	4	8	9	
N. Dak.	-	2	-	-	-	-	-	17	44	58	-	-	-	1	
S. Dak.	2	2	-	-	-	-	-	27	89	104	-	-	-	1	
Nebr.	-	-	-	-	-	-	-	72	139	228	-	-	-	-	
Kans.	1	9	-	-	-	-	-	89	566	357	1	4	5	2	
S. ATLANTIC	115	298	-	-	-	4	7	4,292	12,824	13,145	142	340	299	20	
Del.	2	2	-	-	-	-	-	23	185	274	2	4	2	-	
Md.	15	62	-	-	-	2	4	606	1,670	2,032	5	19	15	-	
D.C.	9	16	-	-	-	-	-	172	810	726	12	31	21	-	
Va.	18	37	-	-	-	-	-	471	1,185	1,067	21	40	33	-	
W. Va.	2	14	-	-	-	-	-	92	198	214	1	2	-	-	
N.C.	15	35	-	-	-	1	2	804	1,719	1,825	17	43	20	-	
S.C. †	3	25	-	-	-	1	1	253	1,066	1,101	5	16	13	3	
Ga.	14	51	-	-	-	-	-	836	2,283	2,543	33	82	71	17	
Fla.	37	56	-	-	-	-	-	1,035	3,708	3,299	46	103	124	-	
E.S. CENTRAL	48	110	2	-	2	1	1	1,874	5,157	3,969	38	86	40	3	
Ky. †	15	24	-	-	1	-	-	455	757	1,62	5	7	1	1	
Tenn.	23	30	2	-	-	-	-	502	1,891	1,289	21	41	15	2	
Ala.	10	30	-	-	1	1	1	493	1,448	1,192	4	18	9	-	
Miss.	-	26	-	-	-	-	-	424	1,061	1,326	8	20	15	-	
W.S. CENTRAL	66	124	-	-	-	-	-	2,216	7,500	8,142	83	193	155	42	
Ark.	1	4	-	-	-	-	-	216	672	408	5	12	6	11	
La.	17	32	-	-	-	-	-	414	992	1,013	17	17	12	-	
Okla.	9	21	-	-	-	-	-	216	619	588	1	2	5	9	
Tex. †	39	67	-	-	-	-	-	1,370	5,217	6,133	60	162	132	22	
MOUNTAIN	17	33	3	-	-	-	-	1,040	2,221	1,802	11	20	19	-	
Mont.	2	2	-	-	-	-	-	32	79	138	-	-	-	-	
Idaho	1	1	-	-	-	-	-	59	92	59	1	1	-	-	
Wyo.	-	-	-	-	-	-	-	22	59	37	-	-	3	-	
Colo.	-	-	-	-	-	-	-	237	561	511	4	11	6	-	
N. Mex.	4	7	1	-	-	-	-	122	305	260	6	6	4	-	
Ariz.	8	19	-	-	-	-	-	363	670	401	-	-	4	-	
Utah	-	-	2	-	-	-	-	45	104	99	-	-	1	-	
Nev.	2	4	-	-	-	-	-	160	351	297	-	2	1	-	
PACIFIC	79	280	-	1	4	-	-	3,083	8,527	9,302	50	256	241	12	
Wash.	NA	-	-	-	-	-	-	301	580	402	NA	-	9	-	
Oreg.	9	14	-	-	-	-	-	209	639	612	1	10	3	-	
Calif.	66	249	-	-	3	-	-	2,495	6,990	7,904	49	244	225	12	
Alaska	-	-	-	-	-	-	-	50	202	205	-	-	-	-	
Hawaii	4	17	-	1	1	-	-	28	116	175	-	2	4	-	
Guam	-	-	-	-	-	-	-	-	-	-	6	NA	-	-	
P.R.	4	4	-	NA	-	NA	-	19	65	135	7	23	25	-	
V.I.	-	-	-	-	-	-	-	4	8	16	-	-	1	-	
Pac. Trust Terr. †	1	2	-	-	-	-	-	1	10	32	-	-	-	-	

NA: Not available.
 *Delayed reports received for 1978 are not shown below but are used to update last year's weekly and cumulative totals.
 †The following delayed reports will be reflected in next week's cumulative totals: TB: N.H. -1, S.C.-5, Ky. -1, GC: N.H. -1, Pa. +568, Pac. Tr. Terr. +9; Syphilis: Pa. +8, Tex. -1.

TABLE IV. Deaths in 121 U.S. cities,* week ending
January 20, 1979 (3rd week)

REPORTING AREA	ALL CAUSES, BY AGE (YEARS)					P & I** TOTAL	REPORTING AREA	ALL CAUSES, BY AGE (YEARS)					P & I** TOTAL
	ALL AGES	>65	45-64	25-44	<1			ALL AGES	>65	45-64	25-44	<1	
NEW ENGLAND	684	464	160	22	18	56	S. ATLANTIC	1,250	739	345	78	42	63
Boston, Mass.	176	105	49	8	8	14	Atlanta, Ga.	108	55	40	11	-	3
Bridgeport, Conn.	42	34	8	-	-	5	Baltimore, Md.	263	144	80	19	9	2
Cambridge, Mass.	32	24	7	1	-	4	Charlotte, N.C.	103	56	33	3	4	7
Fall River, Mass.	39	33	6	-	-	1	Jacksonville, Fla.	97	65	20	2	2	5
Hartford, Conn.	50	26	16	3	2	1	Miami, Fla.	122	64	38	10	6	5
Lowell, Mass.	32	24	3	2	-	2	Norfolk, Va.	63	29	23	4	6	5
Lynn, Mass.	23	17	3	-	-	4	Richmond, Va.	93	58	24	6	3	9
New Bedford, Mass.	36	25	10	-	-	2	Savannah, Ga.	61	34	17	3	5	6
New Haven, Conn.	50	32	14	-	3	3	St. Petersburg, Fla.	109	92	11	3	1	4
Providence, R.I.	66	44	12	4	2	8	Tampa, Fla.	62	41	16	3	1	8
Somerville, Mass.	13	9	4	-	-	2	Washington, D.C.	123	75	32	8	5	7
Springfield, Mass.	43	30	11	2	-	5	Wilmington, Del.	46	26	11	6	-	1
Waterbury, Conn.	23	15	4	2	-	2							
Worcester, Mass.	59	45	10	-	3	5							
							E.S. CENTRAL	881	540	227	54	24	48
MID. ATLANTIC	2,191	1,423	521	127	53	112	Birmingham, Ala.	154	94	39	11	8	1
Albany, N.Y.	48	34	11	1	2	2	Chattanooga, Tenn.	58	40	12	2	1	6
Allentown, Pa.	24	18	6	-	-	-	Knockville, Tenn.	61	44	14	2	1	1
Buffalo, N.Y.	107	60	35	7	3	5	Louisville, Ky.	126	75	33	9	6	13
Camden, N.J.	37	25	11	1	-	3	Memphis, Tenn.	202	118	56	8	2	3
Elizabeth, N.J.	25	17	6	2	-	2	Mobile, Ala.	90	49	30	6	2	8
Erie, Pa.†	43	24	14	2	3	3	Montgomery, Ala.	50	39	4	5	1	8
Jersey City, N.J.	41	22	15	1	2	-	Nashville, Tenn.	140	81	39	11	3	8
Newark, N.J.	76	34	19	12	7	2							
N.Y. City, N.Y.	1,437	933	348	87	29	68	W.S. CENTRAL	1,482	833	383	111	81	51
Paterson, N.J.	27	15	3	5	2	4	Austin, Tex.	56	34	10	7	4	4
Philadelphia, Pa.†	195	113	56	16	7	12	Baton Rouge, La.	44	21	18	3	-	5
Pittsburgh, Pa.†	85	44	36	3	1	2	Corpus Christi, Tex.	48	30	13	1	2	1
Reading, Pa.	33	29	3	-	-	-	Dallas, Tex.	245	155	60	13	9	11
Rochester, N.Y.	131	95	18	5	5	10	El Paso, Tex.	64	40	13	-	8	6
Schenectady, N.Y.	25	21	3	-	-	2	Fort Worth, Tex.	98	59	26	6	4	-
Scranton, Pa.†	26	20	6	-	-	3	Houston, Tex.	328	138	101	41	26	4
Syracuse, N.Y.	76	51	21	2	-	3	Little Rock, Ark.	67	39	20	1	3	3
Trenton, N.J.	44	26	10	3	1	4	New Orleans, La.	150	80	36	11	10	1
Utica, N.Y.	19	12	4	-	1	1	San Antonio, Tex.	170	108	36	12	7	4
Yonkers, N.Y.	41	31	8	1	1	6	Shreveport, La.	97	55	24	6	4	3
							Tulsa, Okla.	115	74	26	10	2	9
E.N. CENTRAL	2,286	1,373	611	148	88	86	MOUNTAIN	672	412	165	41	23	34
Akron, Ohio	70	47	13	1	6	-	Albuquerque, N. Mex.	69	42	11	8	2	9
Canton, Ohio	45	33	11	1	-	2	Colo. Springs, Colo.	33	18	5	4	1	6
Chicago, Ill.	576	338	160	47	16	20	Denver, Colo.	157	95	42	8	4	9
Cincinnati, Ohio	155	96	44	6	5	2	Las Vegas, Nev.	63	37	18	3	3	1
Cleveland, Ohio	181	100	52	14	10	2	Ogden, Utah	18	9	4	1	4	-
Columbus, Ohio	86	49	27	5	4	3	Phoenix, Ariz.	147	90	43	8	2	-
Dayton, Ohio	112	64	36	4	5	1	Pueblo, Colo.	28	20	7	-	-	5
Detroit, Mich.	265	157	70	19	11	9	Salt Lake City, Utah	62	39	16	4	2	3
Evansville, Ind.	45	30	13	1	1	2	Tucson, Ariz.	95	62	19	5	5	1
Fort Wayne, Ind.	58	38	16	1	1	6							
Gary, Ind.	18	11	4	2	1	1							
Grand Rapids, Mich.	50	37	11	-	-	7							
Indianapolis, Ind.	152	78	37	17	12	11	PACIFIC	1,861	1,233	414	105	58	67
Madison, Wis.	41	22	13	1	2	5	Berkeley, Calif.	15	13	2	-	-	-
Milwaukee, Wis.	154	96	42	5	7	4	Fresno, Calif.	54	39	11	-	2	3
Peoria, Ill.	39	25	9	2	1	2	Glendale, Calif.	13	8	4	1	-	-
Rockford, Ill.	33	21	7	3	-	3	Honolulu, Hawaii	59	35	17	4	1	-
South Bend, Ind.	40	24	10	4	1	2	Long Beach, Calif.	135	96	28	4	5	7
Toledo, Ohio	94	62	16	10	4	3	Los Angeles, Calif.	494	334	107	30	9	19
Youngstown, Ohio	72	45	20	5	1	1	Oakland, Calif.	85	48	25	6	4	8
							Pasadena, Calif.	36	24	7	3	2	1
							Portland, Oreg.	162	103	36	12	6	3
W.N. CENTRAL	717	476	157	30	39	35	Sacramento, Calif.	65	38	15	6	4	2
Des Moines, Iowa	54	44	9	-	1	1	San Diego, Calif.	119	72	31	10	2	2
Duluth, Minn.	30	18	7	2	1	2	San Francisco, Calif.	165	115	28	12	6	-
Kansas City, Kans.	32	22	7	1	1	1	San Jose, Calif.	183	114	40	10	11	7
Kansas City, Mo.	127	80	28	5	11	6	Seattle, Wash.	169	115	42	5	3	7
Lincoln, Nebr.	36	26	7	2	-	3	Spokane, Wash.	53	40	11	-	2	5
Minneapolis, Minn.	94	65	18	3	7	6	Tacoma, Wash.	54	39	10	2	1	3
Omaha, Nebr.	83	48	28	2	2	2							
St. Louis, Mo.	160	102	32	9	13	7							
St. Paul, Minn.	59	44	11	2	2	2	TOTAL	12,024	7,493	2,983	716	426	552
Wichita, Kans.	42	27	10	4	1	5	Expected Number	11,687	7,239	2,924	651	419	452

*Mortality data in this table are voluntarily reported from 121 cities in the United States, most of which have populations of 100,000 or more. A death is reported by the place of its occurrence and by the week that the death certificate was filed. Fetal deaths are not included.

**Pneumonia and influenza

†Because of changes in reporting methods in these 4 Pennsylvania cities, there will now be 117 cities involved in the generation of the expected values used to monitor pneumonia and influenza activity in the United States. Data from these 4 cities will appear in the tables but will not be included in the totals for the United States and the Middle Atlantic Region.

Current Trends**Influenza – United States**

Recent outbreaks of influenza-like illness have been reported from the following areas: Alaska, Alabama, Georgia, Mississippi, Nebraska, New York City, Wyoming, and Washington. In addition to those previously noted (1), A(H1N1) isolates have also been reported from Alabama, Alaska, Idaho, Louisiana, Michigan, Mississippi, Nebraska, Nevada, South Carolina, Tennessee, Vermont, and Wisconsin.

Reported by the New York City Epidemiologist and by State Epidemiologists from the aforementioned states; and the Immunization Div, Bur of State Services, CDC.

Reference

1. MMWR 27:537, 1979

Child Abuse in Georgia, 1975-1977

Sixty-two percent of child abusers in Georgia in the 2-year period from July 1975 to July 1977 were natural parents, according to a recent study by the Georgia Department of Human Resources. The report, which examined the social and demographic characteristics of abused children, their families, and the abusers in the state, also found that natural mothers who abused their children were more likely than other mothers to have begun childbearing in their teenage years, and that children born out-of-wedlock were 2.5 times more likely to be abused than children born in wedlock.

The study was based on reports received by the Child Abuse Registry and reviewed by the local county child protective worker. Of 2,281 cases reported, 1,319 (58%) reports were verified as cases of physical or sexual abuse. A confirmed case was one in which the local county worker determined that sufficient evidence had been obtained to confirm the abuse. Cases of neglect were not included, and no assessment of completeness of reporting was made.

Almost half (48%) of the reports of possible abuse were made by 3 sources: medical clinics, school officials, and concerned citizens. Private physicians and public health officials were not a common source of referral; together they reported only 5% of the cases. Those who reported a case that was subsequently confirmed were most likely to be school officials, the police, and juvenile courts; those reports made by citizens and relatives were the least likely to be subsequently confirmed as actual abuse cases.

The Abused Child

Almost 20% of the confirmed cases had a history of being previously abused, and the children with a previous history of abuse were more likely than others to have the current report of abuse confirmed. Court action was taken to protect the child in 23% of the cases. For all age groups, rates in urban areas were at least 1.3 times higher than rates in rural areas; for urban 15- to 18-year-old youths the rate of abuse was 2.5 times higher.

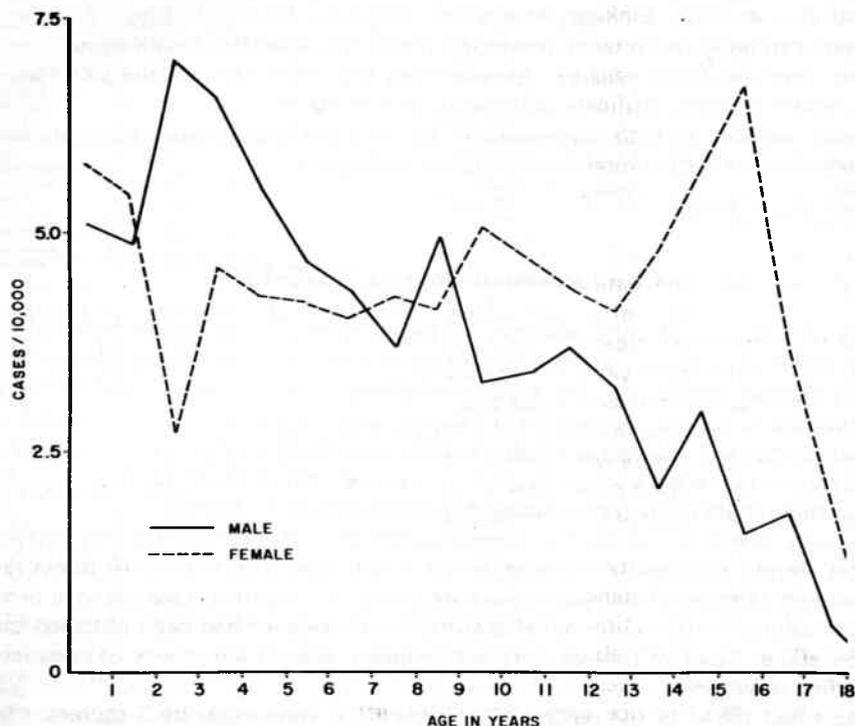
Abuse rates were higher for females than males in both urban and rural areas. Fifty-four percent of the confirmed cases were females. The highest male rate (7.2/10,000) was seen in the 2- to 3-year-old age group, and the highest female rate (7.0/10,000) was in those 15-16 years old (Figure 2).

Bruises were the most commonly sustained injuries, although 22% of all cases had multiple injuries. In 14.3% of all confirmed cases, the child had been sexually abused. With females, sexual abuse was more common, representing 23.8% of all confirmed female abuse cases. For boys, there was a higher rate of burns, abrasions, skull fractures, brain damage, malnutrition, and multiple injuries. The mean age of the sexually abused child was 10 years; almost 90% were girls. Twenty-six children died following abuse.

Child Abuse - Continued

The death-to-case ratio was 20 per 1,000, and the 0- to 4-year-old age group had a significantly higher death-to-case ratio than any other age group.

FIGURE 2. Confirmed child abuse rate, by age, male and female children, Georgia, July 1975-June 1977



The Family of the Abused Child

Both natural parents were living in the household in 39% of the instances in which a confirmed case of child abuse occurred (Table 1). The natural mother was the only caretaker present in 26% of the cases; by contrast, the natural father was the sole caretaker in only 2.5% of the cases. The mean age of the natural father, when living in the home at the time of the abuse, was 33 years; the mean age of the natural mother, when present, was 28 years. The abused child was the only child in the family in 23% of the cases, while 1 to 2 other children were present in 50% of the cases, and more than 2 other children were there in the remaining instances.

TABLE 1. Household composition of confirmed child abuse cases, Georgia, July 1975 - June 1977

Composition	Number	Percent
Both natural parents	511	38.7
Natural mother only	337	25.5
Natural mother - stepfather	217	16.5
Stepmother - natural father	50	3.8
Natural mother - substitute father	49	3.7
Natural father only	33	2.5
Other	122	9.3
Total	1,319	100.0

Child Abuse — Continued

To determine if the abuse of younger children is associated with, or predicted by, events identifiable before or at the time of birth, the reports of confirmed abused children less than 4 years of age were linked with these children's Georgia birth certificates. (This age was chosen because new birth certificates containing detailed medical histories were adopted in 1973.) Linkage was accomplished in 75% of the 326 cases.*

Three perinatal characteristics—marital status, complications related to pregnancy and delivery, and birth weight—were examined for the children in the study and compared with the birth certificate data for all children born in Georgia in 1976. The only significant association with subsequent child abuse was out-of-wedlock births ($p < .05$). Although the rates of complications and of low birth weight were higher in the abused children, they were not statistically significant.

The Child Abusers

The mean age of all child abusers was 30; 58% were males. Sixty-two percent of the child abusers were the natural parents. Half were mothers; their most common age, 20-24 years. Of the 50% of abusers who were fathers, 40-44 years was the most common age range. Fifty-three percent of all natural mothers who were child abusers had had a live birth in their teenage years, whereas in Georgia approximately one-third of all natural mothers have had an adolescent pregnancy.

In cases of sexual abuse, 35% of the abusers were the natural fathers. In 68% of the cases of sexual abuse, there was a previous history of some type of abuse.

Reported by J Alley, MD, B Cundiff, MS, J Terry, MD, Georgia Dept of Human Resources; Family Planning Evaluation Div, Bur of Epidemiology, CDC.

Editorial Note: The ability to draw inferences about differences in child abuse rates depends upon the completeness of reporting and upon the bias introduced by reporting practices. The determination of abuse may be influenced by such characteristics as past history of suspected abuse; social, economic, and cultural differences between the investigator and those investigated; and the frequency and intensity of the family's contact with a social service agency (1). This registry does not include negligence, a more common event. The extent to which certain segments of a population may be either reported more frequently, or subject to those stresses or behavior patterns which can lead to child abuse was not evaluated in this study.

Child abuse in the United States first received national recognition in 1946 when Caffey, a specialist in pediatric radiology, discussed several cases involving multiple fractures of infants in various stages of healing (2). Kempe coined the term "the battered child" in a 1962 article, in which he presented findings of reported incidents of abuse from 71 hospitals and 77 district attorneys representing the entire United States (3).

*The only significant difference between linked abused children and unlinked abused children was that the ability to link records was inversely related to the age of the child. This may be due to the greater likelihood that older children were born in another state.

The Morbidity and Mortality Weekly Report, circulation 84,000, is published by the Center for Disease Control, Atlanta, Georgia. The data in this report are provisional, based on weekly telegraphs to CDC by state health departments. The reporting week concludes at close of business on Friday; compiled data on a national basis are officially released to the public on the succeeding Friday.

The editor welcomes accounts of interesting cases, outbreaks, environmental hazards, or other public health problems of current interest to health officials. Send reports to: Center for Disease Control, Attn: Editor, Morbidity and Mortality Weekly Report, Atlanta, Georgia 30333.

Send mailing list additions, deletions, and address changes to: Center for Disease Control, Attn: Distribution Services, GSO, 1 SB-36, Atlanta, Georgia 30333. When requesting changes be sure to give your former address, including zip code and mailing list code number, or send an old address label.

*Child Abuse — Continued**References*

1. Gil DG: Violence Against Children, Physical Child Abuse in the United States. Cambridge, Harvard Univ Press, 1970
2. Caffey J: Multiple fractures in the long bones of infants suffering from chronic subdural hematoma. AJR 56:163-173, 1946
3. Kempe CH, Silverman FN, Steele BF, Droegemueller W, Silver HK: The battered child syndrome. JAMA 181:4-11, 1962

Erratum, Vol. 28, No. 1

- p 4 In the cardiovascular disease section of the article "Highlights of the Surgeon General's Report on Smoking and Health," the statement was made that "women who smoke and use oral contraceptives are at a significantly elevated risk of fatal and non-fatal myocardial infarction *and thromboembolism*." The latter 2 words should be deleted.

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